

# CI, INNOVATION, AND CHINESE PATENTS

*Chinese companies industrialize innovation and apply increasingly for high-value patents – at home and also abroad. Foreign companies need to be alert and start accessing this great pool of information for competitive intelligence.*

*by Alexander Gangnus*

Not only the Chinese Patent Office State Intellectual Property Office (SIPO), but also patent offices all across the world are being inundated by applications from the People's Republic of China. Recent statistics show that in 2014, 928,000 invention patents were applied for in China. 86.3% of all applications were filed by domestic entities. In 2013, China already ranked third when it comes to the filing number of international PCT patents, only surpassed by the U.S. and Japan.

According to the Chinese government's plans, Chinese inventors and companies should reach an amount of over two million intellectual property rights filed per year until 2020. But according to the latest figures, it is clearly visible that this goal was already reached. From January 2014 until November 2014, altogether 2,015,267 invention patents, utility models, and design patents were filed at SIPO. There is no sign that this surge is about to stop.

## **STRENGTHENING INNOVATIVE POWER**

The Chinese innovation offensive is a result of the central government's plan to transform the country into an innovation-oriented society until 2020. By 2050, China is expected to become one of the globally leading innovation economies. To achieve those ambitious goals, the Middle Kingdom heavily invests in its research and development. Measured by the share of R&D investments to the total gross domestic product, the People's Republic already ranks among the world's top 25. The government plans to increase spending for research and development to 2.5% of the GDP until 2020, leading to high investments, given the anticipated

further growth of the Chinese economy remains at about 7% per year.

To further strengthen China's innovative power and to accelerate the commercialization of its output, the government is committed to the sustainable development of a competitive Chinese innovation landscape. Two important centers of this development are the *Zhongguancun Science Park* in Beijing, also known as "China's Silicon Valley", and the *Zhangjiang Hi-Tech Park* in Shanghai. Emerging cities like Shenzhen, Xi'an, or Chongqing also score with extensive R&D initiatives. Additionally, there are numerous regional clusters with specific subjects such as medical technology, robotics, or aerospace. The government encourages such centers through lush subsidies, low-interest loans, tax breaks and the provision of modern infrastructure.

Even small companies are strongly encouraged now. Thus, the Chinese Patent Office SIPO has announced new measures to support technology-based SME's in China with their innovation activities. In addition to advice concerning the identification of the individual potential for innovation and IP management, start-ups will soon be supported through accelerated patent application processes and cost reductions.

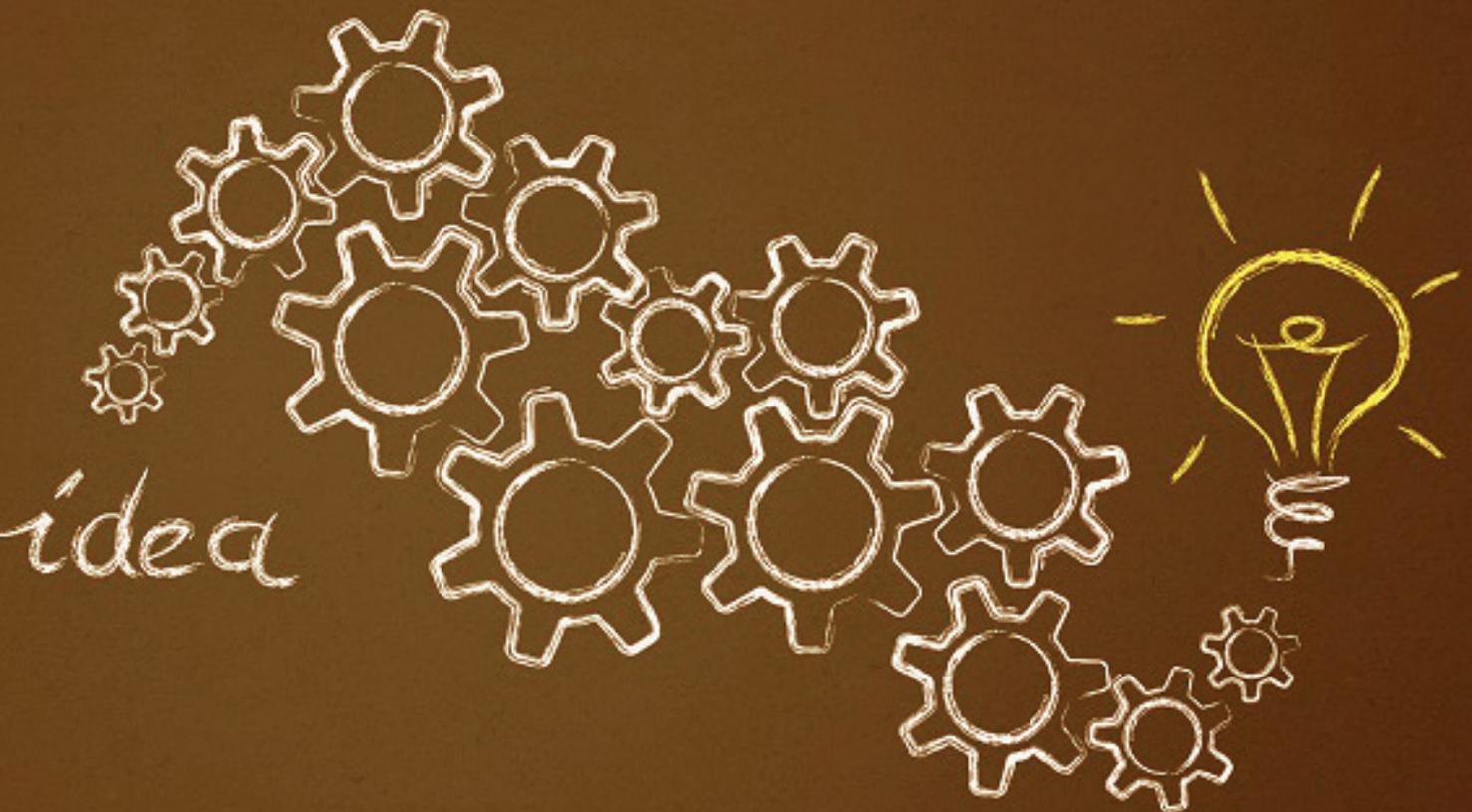
In the current Five-Year-Plan, the Chinese government has identified seven key industrial areas as strategically supported industries. These areas include energy conservation and environmental protection, new information technology, biotechnology, high-quality equipment, non-fossil energy, new materials and alternative automotive propulsion technologies. Other industries, in which

Chinese companies are innovative at the moment, are pharmaceuticals, consumer electronics, medical and telecommunications equipment, and drones.

In the field of electrical mobility, Chinese companies have always been in the lead, also fueled by the government's strong support for the industry. The car manufacturer BYD for example just introduced

institutions have also advanced into areas that were considered to be domain of the West. Within a few years, Chinese scientists acquired the knowledge necessary for the development of a supercomputer, and thereby skyrocketed to the research elite in the computer industry through the development of the *Tianhe 2*.

The results of the research and development



the world's first fully-electric, long-distance coach with a range of about 300 kilometers.

Innovations related to industrial production are still at the center of attention for the Chinese. In the fast-growing field of robotics, the technology company *SIASUN Robot & Automation* established itself on the worldwide market. The company has built an industrial production plant in Shenyang with an annual capacity of 5,000 robots, all in the testing phase at the moment. In the booming laser technology sector, the Wuhan-based company *Huagong Laser Engineering* is one of the leading manufacturers of laser systems for many applications.

More recently, Chinese companies and research

in those areas are consistently protected by intellectual property rights. This policy explains the current wave of Chinese patents that flood the major patent offices in the world at the moment. The Chinese government's objective is that these strategic industries will account for 15% of the country's GDP by 2020.

The registration of patents for inventions, designs, and utility models is used by Chinese entities as a competitive strategy. Intellectual property rights are used to isolate markets in those industries in which the People's Republic wants to be a leader. We call this strategy the "Great Wall of Patents."

## INDUSTRIALIZATION OF INNOVATION

China is less focused on radical breakthroughs; it is instead focusing on the steady and gradual improvement of existing products, services, processes, and business models - time and cost always in mind. In China, it is not about disruptive, but incremental innovation, not technological breakthroughs, but accelerated continuous development.

In order to accelerate innovation, Chinese researchers and developers split a development process into many individual steps and assign large teams to each of those steps. The results are then recombined again. This is how innovation is industrialized in China. The project teams solve problems during development by gathering all relevant staff at a round table; the principle is called "huddle and act." The information flow is horizontal in nature and very quick through short distances across departmental boundaries. Consequently, R&D departments in China are always located close to production.

The team's responsibility for a single development step guarantees a narrow focus and maximum innovation power. The individual innovation teams enjoy great freedom within their field of activity, act independently and are only required to complete the project in time. The resulting product does not have to be perfect from the start - improvements are usually made later, based on customer ratings. The advantage of this industrialization of innovation is obvious. By splitting up the innovation processes, Chinese institutions and enterprises can reduce development time and keep project costs low. The time-to-market is reduced and the ability to quickly convert accelerated innovation into mass distribution increases.

Due to the industrialization of innovation, Chinese companies gain a competitive advantage in the fast-paced technological world markets. They can quickly and flexibly respond to changing market conditions and develop new markets relatively quickly. Western companies should be aware of the challenge and take appropriate actions. In many industries, it is now important to observe

Chinese innovations very closely, to analyze and to evaluate them. Patent research in primary sources and Chinese language are the method of choice. However, the devil hides in the details.

## COMPETITIVE INTELLIGENCE THROUGH CHINESE PATENT ANALYSIS



In recent years, the surging number of Chinese patent applications was not left unnoticed but a thorough analysis revealed that most applications just represented utility models protecting what was considered state-of-the-art in the West. Repeated warnings of an exponential increase of the technology level by IP experts faded away unheard oftentimes. However, this is changing now. It would also be irresponsible to neglect this valuable information pool

as a great source of competitive intelligence.

IP project experience shows that Chinese companies have not only caught up with Western companies concerning product quality, but also their patent quality has increased significantly during the past years. In several technology fields, Chinese companies are on the same level as their Western competitors, yet they are mostly left unnoticed and "fly under the radar" of the established Western players.

Innovative companies face a challenge now. They need to know to which technology level their Chinese competitors have advanced and which technologies they are protecting. Where are their strengths and weaknesses, in which field are they ahead, in which are they still behind? What technical trends are visible, and what are their R&D strategies? A crucial question for companies is if they still have freedom to operate in China and on international export markets. If not, nullification proceedings or patent infringement litigation initiated by Chinese competitors are an impending threat. A reliable information basis regarding the IP landscape is vital, especially when R&D activities are planned.

This requires professional and thorough research. Needless to say, all information of a patent document needs to be taken into account but, of

utmost importance, is to dig down to the claims and evaluate their protection scope as the core of analysis. The derived information may reveal potential gaps the company's own portfolio and potential risks that need to be eradicated urgently.

Nowadays, there seems to be a great pool of digital sources for patent research. All major patent offices provide cost-free access to their ever expanding databases like USPTO, EPO as well as WIPO, and even China's State Intellectual Property Office (SIPO) is offering certain services in English. Additionally, expensive Western commercial databases claim a full incorporation and manual indexing of Asian patent data. Moreover, small Chinese and Indian start-ups are sprouting in high numbers out of the ground and offering research services as well as more or less useable and reliable patent databases. However, the limitations of each databases need to be taken into consideration and a clever research strategy is indispensable.

The development of a powerful and intelligent research strategy starts with an appropriate translation of the subject-related key words into the Chinese language. Doing this properly requires more than just a simple inquiry of an online dictionary. The Chinese language belongs to an entirely different language family, thus, the fact of it



being a syllable-based language requires in some circumstance an entirely different approach as the following examples demonstrate. The English term assembling machine can either be translated to 安装机 (*anzhuang ji*) or 装配机械 (*zhuangpei jixie*), whereas the Chinese word 底座 (*di zuo*) in turn can be translated into base, foot, pan, subpanel or even underbed.

Which Chinese characters should be used for research is of course decided by the context, but an understanding of the Chinese language paired with experience in the common patent wording can hereby be of decisive advantage. Sometimes, even a combination of English and Chinese characters is leading to the best results, as is the case for certain chemical substances.

Being familiar with Chinese standard technology terms is crucial in order to carry out efficient search and pronunciation-based transliterations as well as typos can turn out fatal. The characters 副 (*fu*), 复 (*fu*), and 负 (*fu*) for instance share the same pronunciation, yet they have completely different meanings. 副 (*fu*) can be translated as *auxiliary*, as used in *auxiliary hook*, *auxiliary drum*, and *auxiliary girder*. 复 (*fu*) means *compound*, used for example in *compound valve*, *compound table*, and *compound winding*. 负 (*fu*), however, is used as translation for the term *negative*, for example



in *negative angle*, *negative force*, and *negative deviation*. Machine translations, which are often used for patent research, are completely useless here.

Cultural and industry experience is needed for the correct selection of synonyms. If relevant synonyms are not added to the search field, intentionally as well as unintentionally hidden patents get exempted from the search scope. When searching for certain electronic appliances one should carefully decide to include or exclude for instance 电气 (*dianqi*) meaning *electric*, 电器 (*dianqi*) meaning *electrical device* and 电子 (*dianzi*) which is used as an adjective before certain devices meaning *electronic*, *electrical* or *digital*. Furthermore, it needs to be checked if all abbreviations were taken into account. 附件 (*fujian*), for example, is an abbreviation of 附加零件 (*fujia lingjian*), meaning *supplementary parts*. Another example could be 注塑机 (*zhusuji*), which is an abbreviation for 注塑成型机 (*zhusuchengxingji*) and means *injection molding machine*.

The preliminary pool of key words is in the next step logically aligned together with Boolean operators. Other wildcards, like the truncation symbols asterisk "\*" and the question mark "?" which are very common and a fundamental tool in Latin based languages, are absolutely impractical. In the Chinese language no grammatical suffixes exist and the concept of conjugation as well as declination is unknown. Instead, the clever utilization of NEAR-operators can significantly increase the result's quality.

According to a "pre-scan" of the search results by native Chinese researchers, the search string is adjusted in several search cycles. IPC classes are either added from the very beginning or step by step during the process. One needs to be aware that Asian patent offices not always assign the same IPC classes to PCT family members just as their American or European counterparts. A solely IPC based search on which many companies credulously trust on, can easily miss out decisive patents. Even commercial database providers that praise their own classification system lose much of their accuracy due to the sheer size of Chinese patent application data and the resulting indexing workload.

As practical experience shows, during the search process and its cycles, it is important to keep record of the used search terms and the resulting quality as well as quantity of results. The ultimate result list is acquired through a funnel-like approach. The number of records is decreasing whereas

the quality is increasing. Preliminary findings are translated and discussed with technical experts of the respective company in order to extract the first clues and whether the search strategy should be adjusted or even extended. Nowadays, companies and professional researchers do not stick only to their original field of technology.

Everybody engaged in the research and analysis of Chinese patents should also be aware of the applicants' various tricks. It is very common to hide the important information of a patent behind blurry language, in order to make it more difficult for the competitors to spot the patent in the mass of data. For the same reason, many applicants use very short titles and abstracts and waive to cite other patents. The actual invention is only described in the patent's claims, which is vital for its protection.

Chinese companies often disguise their company name by naming an affiliated person or company as assignee or inventor, or have an agency register the patent. Many Chinese companies conduct their whole research in the name of a subsidiary or establish a new business vehicle for their IP applications. Therefore, it is very often helpful to investigate the target company's corporate structure as well as related parties before conducting a patent research.

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